

## **ADDITIONAL INFORMATION REGARDING PROPOSAL SUBMISSION, EVALUATION, SELECTION, AND IMPLEMENTATION**

The information contained in Appendix C augments and supersedes Appendix B and applies only to this NRA.

### **C.1 Overview of Program**

#### **C.1.2 Who May Propose**

Proposals may be submitted from any institution within or outside the USA on behalf of their staff members (see Section C.1.3 for special conditions for non-US proposals). In all cases, proposals must identify a single Principal Investigator (PI) who assumes full responsibility for the conduct of the scientific investigation.

Following selection and notification by NASA, the *Chandra* X-ray Center (CXC) will communicate formally only with the PI on technical matters or, in the event that the PI is unavailable, with the person identified in the proposal as the Observing Investigator. However, it will always be the PI's responsibility to respond to any questions concerning observational constraints or configurations.

#### **C.1.3 Foreign Participation**

NASA welcomes proposals from outside the United States subject to the conditions and policies found in Section (I) of Appendix B. In particular, NASA does not fund research conducted at non-U. S. Institutions. Therefore, non-U.S. researchers who propose investigations requiring new *Chandra* observations must seek support through their own national funding agencies. Non-U.S. researchers who seek only to analyze archival data or to undertake theoretical investigations should not propose to this NRA unless they include U.S. Co-Investigators who require funding. The *Chandra* data archives are open to the public; the interested researcher need only contact the *Chandra* X-ray Center for assistance in obtaining the data of interest. Note that institutional endorsement is required for observing proposals with a non-U.S. Principal Investigator. These endorsements may be submitted with the Stage 2 Cost Proposal and should be sent directly to:

*Chandra* Director's Office  
Mail Stop 4  
Smithsonian Astrophysical Observatory  
60 Garden Street  
Cambridge, MA 02138-1516

#### **C.1.4 Supporting Ground-Based Observations**

As part of the proposal and corresponding budget for a *Chandra* investigation, proposers may request support for correlative observations at other wavelengths beyond the joint observations described in this solicitation in Section C.2.3. Funding for such correlative studies will be considered only insofar as they directly support a specific investigation using *Chandra*. Unless there are exceptional circumstances, such as CXO/NOAO joint proposal or some archive or survey proposal, funding for ground-based supporting observations should not exceed 10% of the total request.

#### **C.1.5 Stage 1 Proposal Submission Deadline**

The submission deadline for Stage 1 science proposals is indicated in the summary of solicitation of this NRA. Late proposals or proposal modifications received after the latest date specified for receipt may be considered if a significant reduction in cost to the Government is probable or if there are significant technical advantages, as compared with proposals previously received.

### **C.2 Proposal Types**

Observations to be carried out with *Chandra* during Cycle 4 science operations will be selected from proposals submitted to NASA in response to this NRA. Once the targets are identified, the *Chandra* X-ray Center (CXC) is responsible for generating the science timeline. The timeline is determined for the most part by observing constraints, which are described in detail in the *Chandra Proposer's Observatory Guide*. Proposers may also specify additional constraints such as a particular time or time interval during which an observation must take place. Proposers should note that time-constrained observations are difficult to accomplish efficiently and will be limited to no more than 20% of the total number of observations selected.

There are six categories of proposals that may be submitted in response to this NRA.

#### **C.2.1 General Observing Projects**

There are no restrictions regarding the amount of observing time or the number of targets that may be requested. Proposals may be submitted for single targets with a relatively short observation time or for larger programs involving multiple targets or significant amounts of observing time. All proposals will be reviewed by one of a number of topical peer review panels, and a mix of large and small programs will be selected. Proposals requesting observations distributed over multiple proposal cycles will not be considered.

An observing efficiency including slew and settle time will be used to determine the amount of time available for observations. To evaluate time required by a given

proposal, a "slew tax" of 1.5 ksec will be added to each proposed target; this added time closely represents the observatory time required for each observation.

Proposers should examine the lists of completed and scheduled observations for previous *Chandra* Cycles at <http://cxc.harvard.edu/targetlists.html> as a guide to data which already exist in order to ensure the most efficient use of new observing time. These lists will also allow the proposer to judge, for observing time needs in excess of 300 ksec, the relative merits of a General Observing Project and a Large Observing Project.

All observations must be completed within the 12 months of Cycle 4 observations.

### **C.2.2 Large Observing Projects**

Large Projects are defined as requiring 300 ksec observing time or more, regardless of whether they include long duration observations of single targets or shorter duration observations of many targets. Large Projects must be designated as such by the PI and are encouraged. At least 20% (about 3.2 Msec) of the observing time during Cycle 4 is reserved for them, subject to the submission of proposals of high scientific merit.

The observations proposed for Large Projects must be completed within the 12 month period covered by this NRA. Proposals that require a large number of targets should, whenever possible, indicate alternate targets to help avoid conflicts with smaller proposals that have also been selected and are competing for observing time for the same target. In the case of conflicting proposals for a specific target, the Selecting Official, based on the recommendation of the peer review, may award the target in question to the smaller proposal and choose an alternate target from the Large Project's list. In this case, the proposer of the Large Project may always make use of data taken for another project once they are made public.

Large Projects are evaluated differently than other proposals. A Large Project is first evaluated and graded along with the other observing proposals by a "topical science" panel. The graded Large Projects are then passed to the "merging" panel that develops an integrated observing plan involving all top-rated proposals to fill the observing time available through this solicitation. The merging panel may recommend shortening a Large Project only under exceptional circumstances -- it is intended that a Large Project is an all-or-nothing proposition.

### **C.2.3 Target of Opportunity Projects**

Proposals are also solicited for preplanned Targets of Opportunity (TOO's). These are defined to be observations of unpredictable astronomical events, such as a supernova or a gamma-ray burst, that must take place in order to trigger the observation. The number of times the Observatory can be used to respond to a TOO is limited by operational considerations. For Cycle 4, it is estimated that the Observatory can support no more than 12 rapid-response (defined as an acquisition time < 21 days) and 12 slow-response (> 21 days) TOO's. Once a TOO has been selected, the observing time is awarded but

not scheduled until the triggering event takes place. It is the responsibility of the investigator to alert the CXC of the occurrence of the triggering event. Proposals may not contain a mixture of TOO and non-TOO targets.

Those proposing for a preplanned TOO should be cognizant that any such observations awarded for a given observing Cycle, but not accomplished, cannot be carried over to the next Cycle. Such observations may be proposed again for Cycle 5. Since the NRA is being released prior to the end of Cycle 3, there may be a set of selected and preplanned Cycle 3 TOO's that have not been triggered. Proposers may choose to assume that these will not have been accomplished by the time that Cycle 4 starts in mid October 2002, but at their own risk.

#### **C.2.4 Joint Observing Projects**

Three types of Joint Observing Projects may be proposed.

**(1) Coordinated *Chandra*/Hubble Space Telescope (HST) Proposals.** This NRA solicits proposals to allow observers interested in using both the Hubble Space Telescope (HST) and the CXO to achieve their scientific objectives by submitting a single Phase 1 proposal in response to either HST or *Chandra* Research Announcements. The only criteria above and beyond the usual review criteria are that the project must be fundamentally of a multiwavelength nature and that both sets of data are required to meet the science goals. It is not essential that the project require simultaneous *Chandra* and HST observations. Proposers responding to this NRA may request, and be awarded, HST observing time in conjunction with their *Chandra* observations. One hundred orbits of HST observation time are available for this opportunity. Conversely, up to 400 ksec of *Chandra* observing time are available for award as part of the response to HST research opportunities. However, the *Chandra* project can award no more than one HST Target of Opportunity (TOO) observation with a turn-around time shorter than two weeks.

Proposers wishing to take advantage of the CXO-HST arrangements are encouraged to submit their proposal to the Observatory announcement that represents the prime science. Clearly the expertise to best appreciate and evaluate the proposals will be weighted toward the wavelength band of the observatory of highest relevance. Demonstration of the technical feasibility for both observatories to produce the necessary data is required. Technical information about HST is available at <http://www.stsci.edu>. General policies for HST observations are described in the latest HST Call for Proposals, available at <http://www.stsci.edu/ftp/proposer/cycle11/announce.html>. The Space Telescope Science Institute is prepared to assist observers proposing in response to this opportunity. Questions should be addressed to [help@stsci.edu](mailto:help@stsci.edu).

**(2) Coordinated *Chandra*/National Optical Astronomy Observatories (NOAO) Proposals.** By agreement with NOAO, proposers interested in making use of NOAO facilities (except Gemini) as part of their *Chandra* science may submit a single proposal in response to this NRA. The award of NOAO time will be made to highly ranked *Chandra* proposals and will be subject to approval by the NOAO Director.

The primary criterion for the award of NOAO time is that both *Chandra* and NOAO datasets are required to meet the scientific objectives of the proposal. No NOAO time will be allocated without *Chandra* time. The highest priority for the award of NOAO time will be given to programs that plan to publicly release the optical data in a timely manner (before the required 1 year release) and that create databases likely to have broad application.

NOAO plans to make up to 5% (20 nights at each of the available facilities, with the exception of Gemini) available for this opportunity. NOAO observing time will be divided roughly equally between the Fall 2002 and Spring 2003 semesters.

Proposers wishing to make use of this opportunity must provide the following additional NOAO-related information as part of their *Chandra* proposal:

- 1) Select the joint proposal flag on the Remote Proposal Submission (RPS) form (See Appendix D): either NOAO or NOAO+HST;
- 2) Indicate the choice of NOAO telescope(s) and instrument(s) (dates of availability for the various telescope and instruments can be found on the web at <http://www.noao.edu/gateway/nasa/>);
- 3) Enter the total estimated observing time for each telescope/instrument combination;
- 4) Enter a full and comprehensive scientific and technical justification for the requested NOAO observing time;
- 5) Specify the number of nights for each semester during which time will be required;
- 6) Provide a plan for the public release of the NOAO data within one year of the observation date.

Demonstration of the technical feasibility of the proposed NOAO observations is the responsibility of the proposer. Detailed technical information concerning NOAO facilities may be found at <http://www.noao.edu/>.

If approved for NOAO time, successful PI's will be required to submit the standard NOAO forms providing detailed observing information appropriate to the telescope and instrument combination(s) awarded. NOAO will perform feasibility checks on the proposed observations and reserves the right to reject any observation determined to be unfeasible for any reason. Such a rejection could jeopardize the entire proposed science program and impact the award of the *Chandra* observing time as well.

**(3) Coordinated *Chandra*/XMM-Newton Observing Proposals.** If a science project requires observations from both XMM-Newton, sponsored by the European Space Agency, and the *Chandra* X-ray Observatory, then a single proposal may be

submitted to request time on both Observatories to either the XMM-Newton Cycle 2 Announcement of Opportunity (AO-2) or this *Chandra* Cycle 4 NRA so that it is unnecessary to submit proposals to two separate reviews.

By agreement with the *Chandra* Project, the XMM-Newton Project intends to award up to 400 ksec of *Chandra* observing time. Similarly, the *Chandra* Project intends to award up to 400 ksec of XMM-Newton time. The time will be awarded only for highly ranked proposals that require use of both observatories and shall not apply to usage of archival data. The only criterion above and beyond the usual review criteria is that both sets of data are required to meet the primary science goals. Proposers should take special care in justifying both the scientific and technical reasons for requesting observing time on both missions. It is not essential that the project require simultaneous XMM-Newton and *Chandra* observations. No Targets of Opportunity, either preplanned or unanticipated, will be considered for this cooperative program. For this solicitation, no XMM-Newton time will be allocated without the need for *Chandra* time to complete the proposed investigation.

Establishing technical feasibility is the responsibility of the observer, who should review the *Chandra* and XMM-Newton (<http://heasarc.gsfc.nasa.gov/docs/xmm/xmmgof.html>) documentation or consult with the XMM-Newton Guest Observer Facility (<mailto:xmmhelp@olegacy.gsfc.nasa.gov> XMM observations) or the CXC (<mailto:exchelp@cfa.harvard.edu>). For proposals that are approved, both projects will perform detailed feasibility checks. Both projects reserve the right to reject any approved observation that is in conflict with safety or mission assurance priorities or schedule constraints, or is otherwise deemed to be nonfeasible. Any observation(s) deemed to be not performable as indicated above would cause revocation of both observations.

The proprietary period for data awarded as part of this joint program will be one year from the time of receipt. While the release of the XMM-Newton and *Chandra* data sets will not be tied together, it is emphasized that both the *Chandra* and XMM-Newton projects will ensure that public release is close to one year from the observation time, treating joint programs as high priority for data processing and delivery.

### **C.2.5 Theory/Modeling Projects**

A new opportunity is offered under this Cycle 4 *Chandra* NRA to obtain support for theoretical research. Research that is primarily theoretical/modeling in nature can have a lasting benefit for current or future observational programs with *Chandra*, and it is appropriate to propose theory programs with relevance to the *Chandra* mission. Recent trends in *Chandra* funding suggest that about 5% of the total funding might be used to support up to ten such proposals. Award amounts for theory proposals are anticipated to be similar to those made for observing proposals, for which the majority of the awards in recent cycles have been under \$100K, with an average around \$50K. However, NASA does allow the submission of more ambitious proposals for which larger amounts of funding may be justified, based on the merits of the proposed work and its perceived importance to understanding *Chandra* data.

A Theory/Modeling proposal should address a topic that is of direct relevance to *Chandra* observing programs, and this relevance must be explained in the proposal (research that is appropriate for a general theory program should be submitted to the annual NASA Office of Space Science Astrophysics Theory Program solicitation). The primary criterion for a Theory/Modeling proposal is that the results must enhance the value of *Chandra* observational programs through their broad interpretation (in the context of new models or theories) or by refining the knowledge needed to interpret specific observational results (for example, a calculation of cross sections). As with all investigations supported through this solicitation, the results of the theoretical/modeling investigation should be made available to the community in a timely fashion, nominally one year following the grant award.

A Theory/Modeling proposal must request a specific amount of funding in the Stage 1 submission and must provide a narrative that describes the proposed use of the funds. Detailed budgets are not requested in Stage 1, however, and are due in Stage 2 only (see Section C.3.3 for details). Cost is not an evaluation criteria in the Stage 1 submission.

Theoretical/Modeling research should be the primary or sole emphasis of such a proposal. Analysis of archival data may be included only with the goal of showing how *Chandra* data may be better understood through the results of the proposed Theory/Modeling research. Theory proposals must be submitted using the same proposal format as observing proposals, and the proposal type ‘Theory’ should be checked at the appropriate place on the submission form.

The scientific justification section of the proposal must describe the proposed theoretical investigation and also its anticipated impact on observational investigations with *Chandra*. Review panels will consist of observational and theoretical astronomers with a broad range of scientific expertise. The reviewers will not necessarily be specialists in all areas of astrophysics, particularly theory, so the proposals must be written for general audiences of scientists. The proposal should discuss the types of *Chandra* data that will benefit from the proposed investigation, and references to specific data sets in the *Chandra* data archive should be given where appropriate. The proposal should also describe how the results of the theoretical investigation will be made available to the astronomical community and on what time scale the results are expected.

### **C.2.6 Archival Research Projects**

This solicitation also includes the opportunity to propose investigations based primarily on the interpretation of archival *Chandra* data for part or all of the study. The archive ultimately contains the data from all *Chandra* observations including all calibration observations, Director’s Discretionary Time observations, and GO and GTO observations. The only data not available for archival research are those for which the appropriate proprietary period has not yet expired. There is no proprietary period for calibration data; other proprietary intervals range from 3 to 12 months. The *Chandra* web site (<http://cxc.harvard.edu>) provides access to the data archive.

An Archival Research proposal must request a specific amount of funding in the Stage 1 submission and must provide a narrative that describes the proposed use of the funds. Detailed budgets are not requested in Stage 1, however, and are due in Stage 2 only (see Section C.3.3 for details). Cost is not an evaluation criteria in the Stage 1 submission.

Up to about 2% of the available funding will be available for Archival Research proposals, subject to the panel recommendations.

### **C.3 Proposal Format and Content**

#### **C.3.1 Overview**

Proposal submission and review will be conducted in two stages to minimize the burden of proposal preparation. During the first stage, the scientific and technical merits of the proposed investigation will be reviewed, including the appropriateness of using *Chandra* to address the scientific objectives and the relevance of the investigation to furthering our understanding of high-energy astrophysical processes. Based upon the results of this Stage 1 review (scientific and technical), the *Chandra* Program Scientist at NASA Headquarters will recommend a set of proposals to be considered for award of observing time (proposals for new observations) or award of support for analysis and/or interpretation of existing data (Archival and Theory/Modeling proposals) to the Selection Official. The PI's of these proposals will then be asked to submit a cost proposal for the Stage 2 review (Cost Review) and will also be given an opportunity to submit an Education/Public Outreach (E/PO) proposal. Proposers not included in the recommended set are not prohibited from submitting a Stage 2 proposal, but they should understand that selection of their investigation is unlikely.

A subset of the Stage 1 science peer panel will evaluate the Stage 2 cost proposals. A separate panel will be convened to review the E/PO proposals. Based upon overall consideration of scientific and cost factors, the *Chandra* Program Scientist will recommend a set of proposals for consideration by the Selecting Official for final selection and award. The Stage 2 reviews will take place approximately 6-8 weeks after the end of the Stage 1 review. Following the second review, those proposers selected for award will be notified of the recommended funding level for their investigation. E/PO awards will also be made at this time. Awards to winning proposers will be implemented through the issuance of grants. No awards will be funded by the contract mechanism. Awards to NASA Centers (including JPL) and other U.S. Government institutions will be made by the transfer of funds from NASA.

#### **C.3.2 Stage 1 Research Proposal Details**

**Proposal Content.** The Stage 1 proposal must include a standard Cover Page, a General Form, and the scientific and technical justification (as described below). If the proposal requires new observations, a Target Summary Form also is required (which includes



either two ACIS parameter pages or one HRC parameter page depending upon the detector requested), and, as necessary, a Target Constraints Form and a Target Remarks Form. The proposal must be submitted electronically (see Appendix D for proposal submission instructions). The information will be entered into a data base that will be used in cataloging and evaluating proposals, as well as for scheduling those observations that are selected for implementation. The forms must be completed in the requested format. Cost sections and E/PO proposals should not be submitted for the Stage 1 scientific review. *However, proposals for the Archival Research or Theory/Modeling programs must include a preliminary cost estimate in their Stage 1 proposals.* Formal cost and E/PO proposals will be considered as part of the Stage 2 process.

Although a signature block is included on the General Form, institutional endorsements are optional for the Stage 1 proposal but may be provided by separate hardcopy in those cases where the proposing institution requires them. In all cases, institutional endorsements are required for the hardcopy submission of a Stage 2 cost proposal.

The abstract on the Cover Page is limited to 800 characters, including spaces between words. If the abstract exceeds this length, it will automatically be truncated at 800 characters when entered into the data base. The list of selected targets and corresponding abstracts will be made public.

For proposals involving new observations, the proposer is urged to be as accurate as possible when entering the pointing direction of the Observatory, since even small errors can seriously impact the quality of the data. Positions must be given in equinox/epoch J2000.

Proposers requesting more than one target, or multiple pointings at a single target, should assign a Target Number that indicates the order of priority. Prioritization will aid the Selecting Official in the event that a reduction in observing time is recommended. In such cases, every attempt will be made to honor the highest priority targets.

The discussion of the scientific investigation should address the following:

(1) Scientific Problem. State clearly the scientific problem, with relevant background and references to previous work. Show how the proposed investigation may be used to advance our knowledge and understanding of the field. Justify the use of the CXO or its archival data to accomplish the objectives, in contrast to using other available observatories. Any constraint on the observations must be clearly stated and justified. Discuss the data analysis program required to attain the science goals, including the scope of the effort. Proposals that request funding for Archival Research must include a discussion of any publications that resulted from the observations and an indication as to how and why the proposed research will significantly extend these existing results. Proposals for Theory/Modeling must discuss how the proposed research will further the understanding of *Chandra* data.

(2) Technical Feasibility. For all observing proposals, show how the particular details (observing time, instrument, instrument mode, etc.) of the proposed observations allow one to achieve the stated scientific objectives. State how targets or pointing directions were selected. List assumptions about source intensity, surface brightness, and spectrum. Estimates of both counting rates and total counts needed to accomplish the investigation must be provided. It is in the proposer's best interest to allow a reviewer to understand their assumptions and to be able to easily reproduce the estimates of the counting rate(s). The proposer should also demonstrate that the estimated counts are sufficient to extract the desired science results from the observation. The impacts of pulse pileup on the observed energy spectrum should be addressed for observations with ACIS or HETG/ACIS of even moderately bright sources. Proposals for observations that might encounter pileup must explicitly discuss the plans for dealing with such data in order to demonstrate a thorough understanding of the implications for their proposed research. Proposers wishing to apply for the Hubble Space Telescope, XMM-Newton, and/or National Optical Astronomy Observatories opportunities need also address the technical feasibility of those observations in their proposals.

Proposers interested in Archival Research should also discuss how and why the specific archival data are sufficient to meet their objective(s). Furthermore, such proposals must address the analysis tools, their suitability for accomplishing the investigation, and the proposer's ability to apply such tools to the project.

(3) Constrained Observations. The proposer may desire to place constraints (e.g., monitoring, coordination with observations at other wavelengths, uninterrupted observing periods, roll angle, etc.) on the proposed observations. Constraints limit the flexibility of scheduling and, therefore, reduce the overall observing efficiency. Thus, proposers should carefully consider the impact of a request for a constrained observation and provide scientific justification. Proposers should also note the potential impact on time-constrained observations of potential interruption by a TOO. An observation with restricted tight time or roll constraints, if bumped or otherwise unscheduled, may be delayed six months or more. No more than 20% of *Chandra* observing time will be allocated to constrained observations.

**Proposal Formats.** All proposal text must be in English. Because of the large number of proposals anticipated in response to this NRA, there will be strict page limits as shown in Table 1.

Specifically, the section including the scientific justification and technical feasibility is limited to six pages for observing proposals that are classified as Large Projects (i.e. designated as such by the PI and requesting > 300 ksec) or as Joint Projects (e.g., CXO/HST, CXO/NOAO, and CXO/XMM), and four pages in all other cases including proposals for TOO, Archival Research, and Theoretical/Modeling Research. For purposes of judging the length of the electronic proposal, the following guidelines apply: Each side of a printed paper sheet containing text or illustration will count as one page; text may be either single or double-spaced, but must use an easily read font having no

more than 15 characters per inch with at least 1 inch margins on all sides of a standard 8.5 x 11 inches (US-letter sized) sheet. Proposers are encouraged to use the LaTeX template provided at the CXC website.

Table 1: Proposal Content and Page Limit  
(note: all proposal forms may be found at <http://cxc.harvard.edu/>)

SECTION	PAGE LIMIT	COMMENTS
Cover Page Form	1	No other cover needed
General Form	1	
Scientific Problem and Technical Feasibility: <ul style="list-style-type: none"> <li>• General, TOO, Archival, &amp; Theory/Modeling</li> <li>• Large &amp; Joint</li> </ul>	4 6	Including text, figures, charts, tables and references
Target Summary Form, including ACIS Parameter or HRC Parameter Pages		Not required for Archival or Theory/Modeling proposals
Target Constraints Form	1 or more (optional)	As needed for observing proposals; not required for Archival or Theory/Modeling proposals
Target Remarks Form	1 each (optional)	As needed for observing proposals; not required for Archival or Theory/Modeling proposals
Curriculum Vitae/Bibliography of PI	1	Emphasis should be on relevant experience and publications
Brief Summary of Relevant Experience of Major Contributors	1	A brief paragraph giving relevant experience and number of relevant publications

**Technical Information.** Technical questions concerning the *Chandra* mission and requests for assistance in proposal submission may be addressed to the *Chandra* Director's Office via the Help Desk at: <http://cxc.harvard.edu/> or

*Chandra* Director's Office  
*Chandra* X-ray Center  
Mail Stop 4  
Smithsonian Astrophysical Observatory  
60 Garden Street  
Cambridge, MA 02138-1516  
Telephone: (617) 495-7282  
FAX: (617) 495-7356  
E-mail: [cxchelp@cfa.harvard.edu](mailto:cxchelp@cfa.harvard.edu)

**Electronic Proposal Submission.** All Stage 1 proposals are required to be submitted electronically according to the instructions given in Appendix D. All Stage 2 instructions will be posted by the CXC at an appropriate time. Electronic submission facilitates efficient proposal processing and reduces the likelihood of transcription error into the various databases. Proposers who do not have access to electronic communications should call the *Chandra* Director's Office, (617) 495-7282.

**Proposal Preparation Tools.** Proposal preparation and simulation tools are available on the World Wide Web at <http://cxc.harvard.edu/>. The proposer is urged to make use of these tools and to use them well before the deadline for proposal submission.

### C.3.3 Stage 2 Cost Proposal Details

Cost Proposals are submitted as Stage 2 of the research proposal process.

For Joint Proposals, the *Chandra* Project, the Space Telescope Science Institute (<http://www.stsci.edu/ftp/proposer/cycle11/announce.html>), and the XMM-Newton Guest Observer Facility at GSFC (<http://heasarc.gsfc.nasa.gov/docs/xmm/xmmgof.html>) will each fund the observations on their own satellite. The PI will need to submit a cost proposal to each Institution, following their schedule and using their forms. Once submitted, a hardcopy of the requested budget forms should also be sent to the other institutions for their reference.

Cost proposals will be due approximately six to eight weeks after the Stage 1 selections are announced and must include:

- The *Chandra* Cost Proposal Cover Page Form with institutional signature. If an E/PO Proposal is tendered (see Appendix E), the E/PO box should be checked and an entry made on the budget form. The Certification boxes should also be checked, as appropriate.

- A succinct one or two page Budget Justification. The Budget Justification should include a breakdown of the work assignments for all funded investigators taking part in the investigation, justification of any major purchases including workstations, justification of foreign or excessive travel, and any cost sharing applied to this project. For observing proposals, funding normally only covers the proprietary period for the data of one year. If the PI requires more than this amount of time, he/she should request a longer period-of-performance (up to two years) in his/her proposal, with supporting justification. Archival and Theory/Modeling Research may be proposed for one year of funding only.
- A budget using the Budget Summary form (see the item “Cost Proposal and Funding Information” at <http://exc.harvard.edu>). In addition, a budget may be included that is prepared according to the guidelines of the proposing institution and that includes the cost information listed below. Include a detailed budget for each funded Co-I. The PI's Budget Summary form must include the totals of the Co-I's budgets as line items.
- A list of current or currently proposed research support from all sources for the PI and any funded Co-I's. For Current Support (in any period that will overlap with this award) and Pending Support (include continuations of multiple year awards), include the name of the investigator, project title, sponsoring agency, period of performance and amount of award, and commitment by each investigator in units of full-time equivalent (FTE) work year.
- A copy of the applicant institution's Federally-approved indirect cost rate agreement, if applicable.
- Any required foreign endorsements indicated in the instructions given in Section (I) of Appendix B and Section C.1.3 of this Appendix.
- Required Certifications and Assurances: The signature of the Institutional Representative on the Budget Form verifies that the proposing organization complies with the required certifications (see full text at the end of this Appendix); therefore, they do not need to be independently signed and submitted.

The Budget Summary must contain estimated costs for the following potential expenditures:

- Direct labor, including individual person-months, salaries, wages, and fringe benefits for the personnel involved.
- Travel costs -- itemize trips, including travel to data analysis centers.
- Estimated costs for workstations, other equipment, supplies, and computer services. Itemize items over \$500. See below for additional information on workstation requests.

- Publication costs.
- Subgrants or subcontracts (for example, to fund Co-I's at other than the proposing institution) - itemize expenditures at a level similar to the parent grant.
- Overhead or indirect rates and costs.
- Other costs including any optional Education/Public Outreach costs (note: the E/PO proposal itself must contain an explanation of the costs associated with that activity; see Appendix E).
- Contributions from any cost-sharing plan.
- Total cost of support being requested from NASA.

All resultant grants will be administered in accordance with terms and conditions for CXC Observing Program Awards (see <http://cfa-www.harvard.edu/cfa/sp/grants.htm> for the terms and conditions currently being used for Cycles 2 and 3; the terms and conditions for Cycle 4 will be posted at a later date).

To assure compatibility with NASA's data systems, requested workstation systems must be capable of supporting existing portable data analysis environments on a range of platforms and operating systems including Unix and Linux. Information on the minimum computer system and platforms on which the software is available can be found on the CXC web page <http://cxc.harvard.edu/> (click on "Data Analysis" and then "Download") or by direct link at <http://asc.harvard.edu/ciao/download.html/>.

Requests for workstations must be justified in the science and the technical portions of the proposal and in the budget explanation. Workstations are not allowable as a direct cost unless specifically justified. Any equipment purchase requested to be made as a direct charge under this award must include the equipment description, how it will be used in the conduct of the basic research proposed, why it cannot be purchased with indirect funds, and a statement certifying that the equipment will be used exclusively for research and not for general business or administrative purposes. Regardless of whether the request is through direct or indirect costs, the justification must be provided and should briefly describe the computing capabilities that exist or are expected to exist at the proposer's institution during the period in which the proposed research would be performed and then explain the impact to the proposed work if the request for the additional workstation is declined. The budget request for workstations must be clearly stated in the Budget Summary form as a line item.

## **C.4 Proposal Evaluation, Selection, and Implementation**

The evaluation criteria listed in C.4.1 and C.4.2 supercede the criteria given in Appendix B.

### **C.4.1 Stage 1 Evaluation of Research Objectives**

Evaluation Criteria. The criteria used in the Stage 1 evaluation are listed below in order of importance. The first of these criteria is weighted slightly higher than the second and is weighted three times that of the third.

- The overall scientific merit of the investigation and its relevance to NASA's space science program. For observing proposals, the degree to which the objectives have been satisfied by one or more previous observations will be evaluated. (Appendix A gives instructions for obtaining information on completed and planned observations.)
- For observing proposals, the suitability of using the *Chandra* X-ray Observatory and data products for the proposed investigation; the feasibility of accomplishing the objectives of the investigation within the time, telemetry, and scheduling constraints; and the feasibility of the analysis techniques. For programs incurring a large expenditure of observatory time relative to exposure time (e.g., multiple short exposure or raster scans), the total observatory time required will be considered. For Archival and Theory/Modeling proposals, the relevance to the *Chandra* scientific program ([http://cxc.harvard.edu/udocs/overview\\_cxo.html](http://cxc.harvard.edu/udocs/overview_cxo.html)) will be considered.
- The competence and relevant experience of the principal investigator and any collaborators as an indication of their ability to carry the investigation to a successful conclusion. Past performance in scientific research, as evidenced by the timely publication of refereed scientific papers, will be considered.

The peer review will be conducted using subpanels, each responsible for proposals directed at particular scientific topics. A Merging Panel will then consider the top ranked proposals from the subpanels and will make the final recommendations. Large Projects will be initially evaluated by the appropriate topical subpanel, but the final recommendation for award of time will be made by the Merging Panel.

To aid in the Stage 2 cost review, the data analysis and interpretation effort required to achieve the proposed science goals will also be evaluated by the Stage 1 peer review panels.

#### C.4.2 Stage 2 Evaluation of Budgets and Selection

Based on the Stage 1 ratings, NASA will recommend whether or not a Stage 2 proposal should be submitted. NASA intends to recommend that only a limited number of highly rated investigations proceed to Stage 2. Proposers not recommended to proceed to Stage 2 are not prohibited from preparing a Stage 2 proposal, but they should be aware that their proposed investigation is unlikely to be selected. Optional Education and Public Outreach (E/PO) proposals will also be solicited at this time (see Appendix E), though the E/PO proposal is entirely independent and has no bearing on the selection decision of the research proposal. Stage 2 and E/PO proposals will be due six to eight weeks after announcement of the Stage 1 selections.

A review team comprised of a subset of the Stage 1 peer review panel will review the Stage 2 Cost Proposals for overall consideration of both scientific and cost factors. The E/PO proposals will undergo a separate review as described in Appendix E. The submission or not of an E/PO proposal has no relevance or bearing on the technical evaluation or the budget for the research proposal. In addition to the overall scientific/technical rating of the proposed investigation, input to the Stage 2 review will include an evaluation of the level of effort required to complete the data analysis and interpretation phase of the project or, in the case of an Archival or Theory/Modeling proposal, to achieve the aims of the proposed research program. The criterion used in the Stage 2 evaluation of the proposals will be:

- The total cost of the investigation, including cost realism and reasonableness, in the context of the anticipated level of effort required to carry out the investigation successfully, and total proposed cost in relation to available funds.

On the basis of the Stage 2 evaluation, cost will not be a discriminator in selection, but the proposed cost may be adjusted. Institutional endorsement of the Stage 2 proposal testifies to the technical and cost realism of the proposed investigation.

**Selection.** Based on the totality of the Stage 1 evaluation of scientific merit and technical feasibility and the Stage 2 evaluation of proposed costs, the *Chandra* Program Scientist will recommend a set of proposals to the Selecting Official for final selection and award. Given the submission of proposals of sufficient merit, it is anticipated that approximately 200 investigations, including those for Archival Research and Theory/Modeling Research, will be recommended for selection. The relative value of any highly rated proposals for Archival Research will be considered against the perceived value of proposals for new observations, taking into account the critical resources of available funds and the amount of CXO observing time. NASA reserves the right to offer selections at a reduced level of cost and/or observing time from that proposed in order to fit within the program constraints. Proposers to this program should further understand that the lack of either monetary or observing time resources are sufficient grounds for not selecting a proposal, even though it may be judged to be of high intrinsic scientific merit. Successful proposers will be notified concerning the approval of their proposal and the level of funding approved for their investigation shortly following selection.



Following selection and notification by NASA, the CXC will communicate formally only with the PI on technical matters, or, in the event that the PI is unavailable, the CXC will communicate with the person identified in the proposal as the Observing Investigator. It will be the PI's responsibility to respond to any questions concerning observational constraints or configurations.

## **C.5 Implementation of Selected Proposals**

After notification of selection, PI's of Archival proposals may immediately access the *Chandra* database in order to initiate their investigation.

PI's of proposals requiring new observations will not receive their grants until the observations have been successfully performed and the data provided to them by the CXC. The process of scheduling the observations is as follows: All approved targets will be placed into an observation database in which each observation is assigned a unique identifying number. The *Chandra* Mission Planning and Operations teams at the CXC will then produce a mission timeline from all approved observation requests using the following two-part process: First, for the entire period covered by this NRA, a long-term schedule (LTS) will be generated with a precision of about a week. Additional LTS's will be generated as needed in response to TOO's and other timeline changes. Targets are scheduled in the LTS to achieve maximum efficiency in the observing program within the operational constraints of *Chandra*. Unconstrained observations will be scheduled to produce the highest observing efficiency. A small percentage of the targets will not be assigned to a specific LTS slot but will instead be held in a pool for use in short-term scheduling. Second, about four weeks prior to the anticipated execution of the observations, a short-term schedule (STS) will be produced on the basis of the LTS. The STS is used for the automatic generation of the required spacecraft commands. The STS, including slew times, pointing direction, guide stars, roll angles, etc., will be established approximately two weeks in advance of execution.

The CXC will make its best effort to schedule all approved observations. All approved non-TOO observations that are not scheduled, or that were scheduled but not successfully executed, will automatically be rescheduled within the current observing cycle or carried over into the next observing cycle. However, approved TOO observations that are not triggered will not be carried into the next cycle; they must be proposed again.

If observations have to be cut short because of unforeseen circumstances, the following criteria will determine whether the target will be scheduled for additional observing time. For observations of 3 ksec or greater, the observation will be considered complete if 80% of the approved exposure time was obtained; for observations less than 3 ksec, only one best-effort pointing will normally be attempted.

Principal Investigators may have exclusive use of their data for 12 months after receipt of the data in usable form, after which time the data will be placed in a public archive and be available to other interested investigators. Similar considerations apply to GTO

observations. A PI may waive or shorten the exclusive period, which is customary for observations intended to benefit the general community. The CXC will ensure that the exclusive rights of other PI's are not violated.

## **C.6 Education and Public Outreach**

Education and the enhancement of public understanding of space science are considered to be vital and integral parts of all NASA space science missions and research programs. Therefore, NASA OSS strongly encourages every proposer to any of its programs to include an Education/Public Outreach (E/PO) component in response to the guidelines outlined in Appendix E of this NRA.

## **C.7 Certifications**

The following pages contain copies of the three certifications currently required by U.S. Code. Note that these individual Certifications are included for reference and should not be signed and returned; language is included on the Web-based Cover Page that confirms that these certifications requirements are met once the printed copy of the Cover page is signed by the Authorizing Institutional Representative and submitted with the Stage 2 proposal.

### **C.7.1 Certification Regarding Debarment, Suspension, and Other Responsibility Matters**

This certification is required by the regulations implementing Executive Order 12549, Debarment and Suspension, 14 CFR Part 1265.

(1) The prospective primary participant certifies to the best of its knowledge and belief, that it and its principals:

- Are not presently debarred, suspended, proposed for debarment, declared ineligible, or voluntarily excluded from covered transactions by any Federal department or agency;
- Have not within a three-year period preceding this proposal been convicted of or had a civil judgment rendered against them for commission of fraud or a criminal offense in connection with obtaining, attempting to obtain, or performing a public (Federal, State, or local) transaction or contract under a public transaction; violation of Federal or State antitrust statutes or commission of embezzlement theft, forgery, bribery, falsification or destruction of records, making false statements, or receiving stolen property;
- Are not presently indicted for or otherwise criminally or civilly charged by a governmental entity (Federal, State or local) with commission of any of the offenses enumerated in paragraph (1)(b) of this certification; and
- Have not within three-year period preceding this application/proposal had one or more public transactions (Federal, State, or local) terminated for cause or default.

(2) Where the prospective primary participant is unable to certify to any of the statements in this certification, such prospective participant shall attach an explanation to this proposal.

### **C.7.2 Certification Regarding Lobbying**

- No Federal appropriated funds have been paid or will be paid, by or on behalf of the undersigned, to any person for influencing or attempting to influence an officer or employee of any agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with the awarding of any Federal contract, the making of any Federal grant, the making of any Federal loan, the entering into of any cooperative agreement, and the extension, continuation, renewal, amendment, or modification of any Federal contract, grant, loan, or cooperative agreement.
- If any funds other than Federal appropriated funds have been paid or will be paid to any person for influencing or attempting to influence an officer or employee of any agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with this Federal contract, grant, loan, or cooperative agreement, the undersigned shall complete and submit Standard Form-LLL, "Disclosure Form to Report Lobbying," in accordance with its instructions.
- The undersigned shall require that the language of this certification be included in the award documents for all subawards at all tiers (including subcontracts, subgrants, and contracts under grants, loans, and cooperative agreements) and that all subrecipients shall certify and disclose accordingly.

This certification is a material representation of fact upon which reliance was placed when this transaction was made or entered into. Submission of this certification is a prerequisite for making or entering into this transaction imposed by section 1352, title 31, U.S. Code. Any person who fails to file the required certification shall be subject to a civil penalty of not less than \$10,000, and not more than \$100,000 for each such failure.

### **C.7.3 Certification of Compliance with the NASA Regulations Pursuant to Nondiscrimination In Federally Assisted Programs**

The (*Institution, corporation, firm, or other organization on whose behalf this assurance is signed, hereinafter called "Applicant "*) hereby agrees that it will comply with Title VI of the Civil Rights Act of 1964 (P. L. 88-352), Title IX of the Education Amendments of 1962 (20 U.S.C. 1680 et seq.), Section 504 of the Rehabilitation Act of 1973, as amended (29 U.S.C. 794), and the Age Discrimination Act of 1975 (42 U.S.C. 16101 et seq. ), and all requirements imposed by or pursuant to the Regulation of the National Aeronautics and Space Administration (14 CFR Part 1250) (hereinafter called "NASA") issued pursuant to these laws, to the end that in accordance with these laws and regulations, no person in the United States shall, on the basis of race, color, national origin, sex, handicapped condition, or age be excluded from participation in, be denied the benefits of, or be otherwise subjected to discrimination under any program or activity for which the Applicant receives federal financial assistance from NASA; and hereby give

assurance that it will immediately take any measure necessary to effectuate this agreement.

If any real property or structure thereon is provided or improved with the aid of federal financial assistance extended to the Applicant by NASA, this assurance shall obligate the Applicant, or in the case of any transfer of such property, any transferee, for the period during which the real property or structure is used for a purpose for which the federal financial assistance is extended or for another purpose involving the provision of similar services or benefits. If any personal property is so provided, this assurance shall obligate the Applicant for the period during which the federal financial assistance is extended to it by NASA.

This assurance is given in consideration of and for the purpose of obtaining any and all federal grants, loans, contracts, property, discounts, or other federal financial assistance extended after the date hereof to the Applicant by NASA, including installment payments after such date on account of applications for federal financial assistance which were approved before such date. The Applicant recognized and agrees that such federal financial assistance will be extended in reliance on the representations and agreements made in this assurance, and that the United States shall have the right to seek judicial enforcement of this assurance. This assurance is binding on the Applicant, its successors, transferees, and assignees, and the person or persons whose signatures appear below are authorized to sign on behalf of the Applicant.